

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



A281.9 Ag8F

# Japan's Rice Policy

Economics and  
Statistics  
Service

William T. Coyle

Foreign  
Agricultural  
Economic  
Report  
Number 164





**JAPAN'S RICE POLICY.** By William T. Coyle. International Economics Division, Economics and Statistics Service, U.S. Department of Agriculture. Foreign Agricultural Economic Report No. 164.

## **Abstract**

To alleviate its rice surplus problem, Japan has begun subsidy programs to reduce rice production and increase utilization (more exports, using rice for feed and industrial purposes). Japan's policies reduced U.S. wheat exports to Japan by about \$30 million in 1980 and U.S. rice exports by about \$20 million. A diversion program succeeded in shifting 585,000 hectares (about 1.4 million acres) into other crops, mainly feed crops, soybeans, and grains, thus increasing Japan's self-sufficiency in those crops. Government subsidies to the Japanese rice programs totaled about \$5.2 billion in 1980.

Keywords: Japan, rice, trade, exports.

## **Acknowledgments**

This report is an elaboration of a staff report coauthored with Robert Tetro in June 1980. The author thanks Effie McConkey and Thomas McDonald for their assistance and Robert Bain, John Child, John Dyck, Gary Ender, Rip Landes, Michael Lopez, Steven Magiera, Carmen Nohre, Donald Sillers, and Fred Surls for helpful comments.

## Contents

	Page
Summary .....	vi
Introduction .....	1
Pricing Policy .....	1
Diversion Programs .....	5
Surplus Disposal Programs .....	14
Exports .....	14
Feeding Rice .....	15
Industrial Use .....	17
The Impact of Japan's Rice Policy on U.S. Agricultural Trade .....	19
Pricing Policy .....	21
Diversion Programs .....	21
Surplus Disposal Programs .....	21
Bibliography .....	23
Appendix: Results of Statistical Analysis .....	25

## List of Tables

1 Government purchase, resale, and retail prices for rice; comparisons between domestic producer and international prices, milled basis .....	3
2 Budgetary cost of Japan's rice policy .....	4
3 Percentage change in selected prices, Japan, 1960-79 .....	5
4 Japanese import, resale, and producer prices for wheat, and retail prices for wheat products .....	6
5 Riceland diversion programs .....	7
6 The Japanese Food Agency's involvement in the purchase and sale of rice, milled basis .....	8
7 Incentive payments for growing alternative crops on rice paddy area, 1978-80 .....	9
8 Net return to labor with and without incentive payments for selected crops, 1978 .....	10



	Page
9 Net returns per unit of land and labor for rice and wheat under alternative Government programs, 1978 . . . . .	11
10 Diverted rice area by alternative crop planted, 1978-79 . . . . .	12
11 Cultivated area in selected crops . . . . .	12
12 Diversion policy alternatives and their budgetary costs per hectare, 1979 . . . . .	13
13 Japanese export unit values for rice and comparisons with other rice prices, milled basis . . . . .	15
14 Japan's rice exports and its share of rice imports by Indonesia, Bangladesh, and Korea, milled basis . . . . .	16
15 Japanese formula feed production, grain and protein meal utilization . . . . .	18
16 Japanese imports of selected coarse grains and the U.S. share . . . . .	19
17. Proportion of selected ingredients in total formula feed output . . . . .	19
18 Rice balance sheet . . . . .	20
19 Food Agency procurement and distribution of rice . . . . .	20
20 Japanese wheat production and increases due to diversion and subsidy programs . . . . .	22
21 Planned versus actual and likely allocations of surplus rice, 1979-83 . . . . .	22
Appendix table 1 — Data used for Japanese wheat consumption analysis . . .	26

## Summary

Japan's rice policy has succeeded in reducing rice production and some of its rice surplus. But the policy has cost the United States and other countries some loss in trade. In addition, the policy will probably have to be continued for at least the rest of the decade to bring Japanese rice production and consumption into balance.

To keep its rice production down, Japan has diverted some rice acreage to wheat, thereby reducing its need for wheat imports. U.S. wheat exports to Japan in 1980 were estimated to be about 5 percent (\$30 million) less than what they would have been without the diverted acreage.

To dispose of some of its rice surplus, Japan has begun an aggressive rice-exporting program and has encouraged increased domestic consumption as well. Its rice exports in 1980 amounted to 720,000 metric tons, about 5 percent of total world rice trade. Such a large influx of rice on the world market, subsidized by the Japanese Government and offered below the world market price, reduced the world price. The loss in U.S. export revenues was estimated at about \$20 million, between 1 and 2 percent of the value of total U.S. rice exports.

To limit the disruptions in the rice export market, which affects other rice exporters besides the United States, Japan agreed in April 1980 to limit its rice exports to 1.6 million metric tons between 1980 and 1984. The 420,000 metric tons specified for the period April 1980 through March 1981 were exceeded, however, because of large emergency shipments to South Korea.

Japan's subsidies to its rice-related programs totaled about \$5.2 billion in 1980, about one-third of the country's total agricultural budget. Almost 60 percent of this budget was used to support the producer price at a level about \$150 per ton above the wholesale price and more than three times the world level.

About \$1.4 billion was spent to divert 585,000 hectares (about 1.4 million acres) of riceland to other uses in 1980. Nearly half of that land now produces feed crops, soybeans, and grains, reducing Japan's reliance on imports of those crops. With current trends in rice consumption, an additional 175,000 hectares (432,000 acres) will have to be diverted from rice production to bring consumption and production into balance by 1990.

Other measures to decrease Japan's rice surplus include regulating the domestic consumer price to encourage rice consumption and encouraging other uses of rice, for example, in industrial uses and animal feeds. The current disposal program calls for an additional 300,000 metric tons of rice to be diverted each year to "industrial" uses, but since that term includes chiefly traditional foods (sake, soybean paste, soy sauce, rice cakes, and rice flour), it is unlikely that such uses could absorb that much additional rice.



During the first surplus disposal program, the Japanese used rice in animal feed and found it to be a suitable feed ingredient so long as the proportion of rice did not exceed 10 to 20 percent of the total ration. In the 3 years that the feed substitution program was in effect (1971-73), 3.1 million metric tons of rice were fed, displacing primarily imported corn and sorghum. No rice was used in feed during the first 2 years of the current disposal program although its use is contemplated before the program ends.



# Japan's Rice Policy

*William T. Coyle*  
*Agricultural Economist*

## Introduction

Interest in Japan's rice policy intensified in 1979 when Japan subsidized the export of 620,000 metric tons of surplus rice, about 5 percent of world rice trade that year. This was part of a 5-year surplus disposal program, initiated in April 1979 to dispose of 6.5 million metric tons of rice through exports, livestock feeding, and industrial uses. U.S. rice interests, increasingly dependent on export markets, were distressed by Japan's action in exporting such large quantities of rice at subsidized prices to markets of considerable commercial importance.<sup>1</sup>

When Japan continued this practice in 1980, U.S. rice interests filed an antidumping complaint in early April with the U.S. Trade Representative (USTR) under Section 301 of the 1974 U.S. Trade Act (amended by the Trade Agreements Act of 1979). This law provides redress for action taken by a foreign country that is inconsistent with provisions of a trade agreement or is "unjustifiable, unreasonable, or discriminatory, and burdens or restricts U.S. commerce."

That same month, the United States negotiated an agreement with Japan to limit Japan's rice exports to an average of 400,000 metric tons per year for the remaining 4 years of the disposal program. The agreement provided, however, that annual limits could be exceeded if emergency circumstances warranted and after consultation with the United States. The antidumping complaint was subsequently withdrawn.

The purpose of this report is to put Japan's rice exports into the context of Japan's broader rice policy, a central feature of its agriculture for many years. Japan's subsidizing of rice exports is one part of a three-component rice program that involves:

- A pricing policy, to raise and maintain farm incomes at levels comparable with nonfarm incomes and to adjust consumer prices to encourage greater consumption of rice and less of wheat.
- A diversion program, to reduce rice acreage and production and to increase production (and Japan's self-sufficiency) in other crops.
- A surplus disposal program, to reduce rice stocks through increased exports and alternative uses (in animal feeds and industrial uses, for example).

In general, each of these three components is designed to increase utilization or to reduce production of rice and thereby alleviate the problem of surplus stock accumulation which has been chronic and persistent since the late sixties. Subsidized rice exports are only one manifestation of this policy that affects agricultural trade. Adjustments in the producer and resale (wholesale) prices of rice and wheat affect Japan's import demand for wheat. Diverting rice area to other crops such as wheat, soybeans, and barley likewise reduces import demand for those commodities. Furthermore, disposal of surplus rice in livestock feed displaces an almost equal amount of corn and sorghum, which are mostly imported.

In this report the origin and nature of each component of Japan's rice policy is described. Pricing policy, diversion programs, and surplus disposal programs are detailed in separate sections. The final section outlines the impact of each on U.S. agricultural trade with Japan in 1980.

## Pricing Policy

Japan's agricultural policy after World War II was designed to encourage rice production through pub-

---

<sup>1</sup>Metric units are used throughout this report. A metric ton equals 2,204.62 pounds. A hectare (the metric unit of area) equals 2.471 acres. Rice data unless otherwise specified are in terms of brown rice, which can be converted to a milled basis using a 0.91 milling rate. Years refer to calendar years. The Japan fiscal year (JFY) covers the period April through March.

lic investment in infrastructure, research, and extension to complement economic development efforts by keeping rice prices low, and to avoid the outflow of foreign exchange. The Food Control Law, enacted in 1942, gave the Government authority to carry out this policy through the purchase, sale, and pricing of imported and domestically produced food staples (mainly rice, wheat, and barley). The law stipulated that rice and other staples would be purchased at a price that took into consideration the cost of production, other commodity prices, and general economic conditions and would contribute to stability in household expenditures.

To meet economic development objectives in the fifties, the Government kept the producer price below equilibrium levels. The Government oversaw a system of minimum delivery quotas for rice allocated among prefectures (states) and eventually among farmers. Production in excess of these quotas and normal onfarm requirements could not legally be sold outside of Government channels. Since enforcement was never strict, a black market about half the size of the official market persisted through the fifties (4, p. 175).<sup>2</sup>

Instead of improving farmers' income, which was an implicit goal of the 1942 law, the official purchase price during the fifties actually contributed to a deterioration in the terms of trade between the rural and urban sectors of the country. "The system . . . served as a mechanism for transferring economic surplus from farmers to urban workers" (4, p. 175).

By the beginning of the sixties, rice had become less important in the consumer's budget, and was, therefore, no longer as critical to Japan's economic development (9, p. 28). Japan's agricultural policy at this time shifted toward a more determined effort to improve incomes of rural households.

Since rice had always been the most important agricultural commodity in Japan, its price was closely associated with the problem of lagging rural income. To rectify the growing economic disadvantage of rural areas, the Japanese Diet (parliament) passed the Basic Agricultural Law of 1961 (No. 127). This

law declared that "the objectives of the state's agricultural policies would be to ensure agricultural development and raise the position of those engaged in agriculture in line with the growth and development of the national economy." According to the law, farmers' income would be improved by stabilizing prices of agricultural commodities, increasing agricultural productivity, and stimulating the creation of off-farm employment opportunities. The pricing of agricultural commodities, according to the law, was to be linked closely to maintaining and improving agricultural income "in order to offset the disadvantages inherent in agriculture concerning conditions of production and terms of trade."

While the law set forth in broad terms the income objectives of the country, the question of how to achieve this goal through increases in the rice price became embroiled in political debate. The price-setting process that developed involved various interests connected with the country's rice economy. "Participants included the cabinet and the prime minister, official and unofficial committees and groups within political parties, organizations of farmers, consumers, and labor, government ministries and administrative bodies, different parts of the financial world, agricultural experts, and the mass media" (6, p. 144). The political power of the rural sector assured that rice producers would have a particularly strong hand in this process. Political districts, as they existed in the early sixties, reflected population distribution that prevailed immediately after World War II. Although some redistricting had occurred since, it had not kept pace with the rapid shift of population from rural areas to major cities. As a result, a rural vote, at times, had five times the weight of an urban vote in the Diet.

The Japanese Food Agency, an arm of the Ministry of Agriculture and Forestry (MAFF), administered the producer and resale prices of rice that were determined yearly by the political process.<sup>3</sup> During the sixties, the producer rice price was doubled from 71,250 yen to 148,150 yen per metric ton, and was doubled again during the seventies to a level more than four times the world price (table 1).

<sup>2</sup>Italicized numbers in parentheses refer to items in the Bibliography at the end of the report.

<sup>3</sup>Name changed to Ministry of Agriculture, Forestry, and Fisheries in 1978.



Farmers responded by increasing rice production. Rice production after 1968 exceeded total utilization consistently in every year except the years of the surplus disposal program of 1971-73 and in 1976 and 1980. The new problems of overproduction and surplus stock accumulation were caused by two concurrent developments. First, annual increases in the producer rice price outpaced price increases of other agricultural products. Higher real prices and steadily improving yields generally meant higher incomes, which induced farmers to produce more. Sec-

ond, the resale price of rice was maintained at a high level, although it was kept somewhat below the producer price. This, in combination with a general shift away from rice as incomes rose, led to a decline in per capita rice consumption through the sixties and seventies.

By the end of the sixties, pricing policy had not only created a surplus rice problem, but it had been costly to the Japanese taxpayer. The financial loss to the national treasury that resulted from main-

**Table 1—Government purchase, resale, and retail prices for rice; comparisons between domestic producer and international prices, milled basis**

Year	(1) Government purchase price <sup>1</sup>	(2) Resale price <sup>1</sup>	(3) Retail price <sup>2</sup>	Resale price (2) compared to purchase price (1)	Retail price (3) compared to resale price (2)	(4) Thai f.o.b. price <sup>3</sup>	(5) Japanese producer price <sup>4</sup>	Producer price (5) compared to Thai export price (4)
	-----Yen/metric ton-----			--- Percent ---		Dollars/metric ton		Percent
1960	71,246	79,687	87,000	111.8	109.2	124	198	159.7
1961	72,504	79,231	87,000	109.3	109.8	137	201	146.7
1962	77,605	82,601	87,000	106.4	105.3	153	216	141.2
1963	85,696	88,260	97,500	103.0	110.5	144	238	165.3
1964	95,522	91,484	97,500	95.8	106.6	137	265	193.4
1965	107,802	104,963	112,500	97.4	107.2	138	299	216.7
1966	117,308	111,850	119,000	95.3	106.4	165	326	197.6
1967	133,068	119,945	119,000	90.1	99.2	223	370	165.9
1968	143,618	133,168	141,000	92.7	105.9	203	399	196.6
1969	148,141	137,308	152,000	92.7	110.7	186	412	221.5
1970	151,502	136,300	152,000	90.0	111.5	143	421	294.4
1971	156,080	135,110	152,000	86.6	112.5	129	445	345.0
1972	163,992	138,864	160,000	84.7	115.2	148	541	365.5
1973	188,663	142,967	160,000	75.8	111.9	275	696	253.1
1974	249,359	165,073	173,000	66.2	104.8	542	854	157.6
1975	285,165	208,663	223,000	73.2	106.9	363	960	264.5
1976	303,516	236,850	258,000	78.0	108.9	254	1,022	402.4
1977	315,604	260,458	283,000	82.5	108.7	272	1,165	428.3
1978	315,953	270,531	300,000	85.6	110.9	369	1,504	407.6
1979 <sup>5</sup>	316,465	272,418	314,000	86.1	115.3	334	1,445	432.6
1980 <sup>6</sup>	316,465	281,135	325,000	88.8	115.6	432	1,394	322.7

<sup>1</sup>Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues, Japan fiscal year.

<sup>2</sup>Office of the Prime Minister, *Monthly Statistics of Japan*, various issues.

<sup>3</sup>Thai long grain white rice, 5-7% broken, f.o.b. Bangkok as quoted in Bank of Thailand, *Monthly Bulletin*, various issues.

<sup>4</sup>Yen-to-dollar exchange rates published by International Monetary Fund. A rate of 360 to 1 is used for 1960-70. See appendix table 4 for rates used for 1971-79.

<sup>5</sup>Differential pricing scheme introduced.

<sup>6</sup>Preliminary.

taining the producer price above the resale price increased by about 13 times from 28.1 billion yen in 1960 to 360.8 billion yen in 1970—an increase of almost eight times in real terms (table 2). The size of the deficit became more and more the subject of public concern.

Through the first half of the seventies, the producer price of rice continued to advance at a more rapid rate than prices of other agricultural commodities. The trend reversed after 1974, as policymakers attempted to alleviate the surplus rice problem, in part through price adjustments (table 3). The resale

prices of rice and wheat were adjusted together in the seventies to reflect their substitutability by consumers. Considerable stability in the import and resale prices of wheat before 1973 and annual increases in the producer and resale prices of rice caused wheat to become less expensive than rice (tables 1 and 4). The country was faced with the dilemma of declining per capita consumption of rice, which it produced in abundance, and increasing per capita consumption of wheat, which was mostly imported. By increasing the resale price of wheat relative to that of rice, the Government discouraged wheat consumption and, by taxing imported wheat,

Table 2—Budgetary cost of Japan's rice policy

Japan fiscal year	(1) Total budget of Ministry of Agri- culture, Forestry and Fisheries	(2) Domestic rice control account	(3) Surplus rice disposal account	(4) Riceland diversion	Domestic wheat and barley control account	Imported food grain control account <sup>1</sup>	Cost of rice programs (2, 3, 4) compared to MAFF budget (1)
-----Billion yen-----							Percent
1960	166.9	28.1	—	—	17.5	19.3	16.8
1961	229.6	50.4	—	—	19.1	14.4	22.0
1962	250.2	52.9	—	—	21.5	13.5	21.1
1963	298.7	88.6	—	—	6.5	19.3	29.7
1964	348.5	122.9	—	—	17.3	22.1	35.3
1965	404.9	133.5	—	—	24.2	39.5	33.0
1966	555.1	223.4	—	—	22.5	35.9	40.2
1967	622.2	242.3	—	—	25.1	21.4	38.9
1968	685.3	268.3	—	—	29.2	19.7	39.2
1969	826.7	347.9	—	3.6	22.5	24.2	42.5
1970	992.1	360.8	—	81.8	16.0	22.3	44.6
1971	1,145.2	271.8	174.3	184.0	14.4	24.7	55.0
1972	1,405.6	261.8	165.5	202.9	10.5	25.0	44.8
1973	1,870.9	453.7	72.4	202.7	7.4	-29.5	39.0
1974	2,249.9	602.4	5.2	127.9	13.2	-145.1	32.7
1975	2,289.2	702.0	6.6	106.1	16.2	-84.0	35.6
1976	2,491.9	736.5	4.3	78.7	14.2	9.0	32.9
1977	2,770.7	745.4	1.5	95.6	25.0	86.0	30.4
1978	3,225.9	682.9	—	304.5	49.3	105.9	30.6
1979	3,621.8	738.8	187.7	228.1	81.2	67.1	31.9
1980	3,584.0	649.5	160.8	303.4	81.9	58.1	31.1

— = None or negligible.

<sup>1</sup>Budgetary surpluses except in 1973, 1974, and 1975.

Source: Ministry of Agriculture, Forestry, and Fisheries, unpublished data.



the Government generated revenue to offset partially the cost of the consumer subsidy on rice.<sup>4</sup> Annual revenues from the purchase and sale of imported food grains increased after 1976, reaching \$270 million in 1980. The Government was also able to increase the resale price of rice faster than the producer price, thereby closing the gap between the prices and reducing program losses.

Income parity between urban and farm households was achieved in the seventies, but not primarily because of the Government's pricing policies. Growth in off-farm income was more important in raising rural income as the agricultural component of farm household income dwindled from about 50 percent in 1960 to 30 percent in 1978. Clearly, income from the sale of agricultural commodities had become supplementary. But this supplementary income did indeed make a difference. Without annual increases in support prices of major commodities over the past 20 years, total farm income would have been significantly less than it is today (20).

Although pricing policy may have contributed marginally to the improvement of income for farm households and may have slowed the increase in per capita wheat consumption, it led to a persistent imbalance in the production and consumption of rice. Diversioa programs and surplus disposal schemes were first introduced in the late sixties and early

seventies to help cope with the new problems of overproduction and surplus stocks.

## Diversioa Programs

The Japanese Government has administered three supply management programs over the past decade, all of which were designed to reduce rice production and increase production of other priority crops (table 5). Two 1-year provisional programs were also tried, in 1969 and in 1970.

The Rice Production Control and Diversioa Program (1971-75) used a combination of "administrative guidance" and economic incentives to influence the behavior of farmers.<sup>5</sup> For each of the 5 years in the program, the Government set a nationwide target for rice production based on an estimate of rice demand often at variance with realized consumption. This amount was subtracted from what was considered the production potential (14 million tons, the production level in 1969, was used in the first diversioa program) of Japan's existing rice area. The difference was the reduction target. When divided by an average yield figure, the Government derived an estimate of the number of hectares that would have to be shifted out of rice production in order to bring production in line with anticipated consumption. The nationwide diversioa target was then subdivided among the 46 prefectures (47 after 1972 with the accession of Okinawa) on the basis of historical Government purchases, annual rice production, and other considerations. The prefectural diversioa targets were in turn distributed among various producing regions, and finally among individual farmers.

Aside from using administrative guidance in gaining cooperation of prefectural governments and farmers, the Government enhanced its leverage by using economic incentives. As of 1971, the Food Agency no longer purchased all the rice offered to it. It began purchasing only limited amounts at the favorable support price. Food Agency purchases fell from an annual average of 66 percent of total pro-

<sup>4</sup>In 1974 and 1975, wheat resale prices were subsidized to soften the impact of high world wheat prices on the Japanese consumer.

**Table 3—Percentage change in selected prices, Japan, 1960-79**

Item	1960-64	1965-69	1970-74	1975-79
	Percent			
Producer rice price	34.1	37.4	64.6	11.0
Resale rice price	14.8	30.8	21.1	30.6
Prices of all agricultural products	33.9	27.5	60.3	14.5
Prices of all agricultural inputs	10.5	12.4	71.3	6.5
Consumer price index	25.6	21.1	54.1	27.0

<sup>5</sup>Administrative guidance (*gyoseishido*) consists of recommendations, advice, or directions issued by a Japanese Government agency and is void of coercive legal power.

duction in 1965-70 to 48 percent in 1971-75 (table 6).<sup>a</sup> In addition, support prices during 1969-71 were not increased as rapidly as in the sixties and, more important, large incentive payments were introduced to encourage the idling of riceland or the cultivation of alternative crops.

Diversion payments were first tried under the provisional programs in 1969 and 1970 and amounted to 200,000 yen and 350,000 yen per hectare, respectively.

<sup>a</sup>A certain percentage of the total is retained for onfarm consumption.

ly. These amounts were paid for each hectare retired from rice production and reflected the Government's indifference about what was subsequently done with the land. In both years, rice production exceeded consumption, thus contributing to a growing surplus problem and hastening the advent of a stronger program.

The Rice Production Control and Diversion Program (1971-75) changed the incentive scheme. The payment for cultivating perennials and forage crops was 400,000 yen per hectare, that for annual crops was 350,000 yen, and that for idling land was 300,000

**Table 4—Japanese import, resale, and producer prices for wheat, and retail prices for wheat products**

Year	(1) Import price of wheat <sup>1</sup>	(2) Resale price of wheat <sup>2</sup>		(2) (1) x 100	(3) Prices received by farmers <sup>3</sup>		(3) (1) x 100	Retail prices (Tokyo) <sup>4</sup>		
								Bread	Noodles	Flour
	<i>Dollars per ton</i>	<i>Yen per ton</i>	<i>Dollars per ton</i>	<i>Percent</i>	<i>Yen per ton</i>	<i>Dollars per ton</i>	<i>Percent</i>	----Yen per kilogram----		
1960	66	35,910	98	1.48	37,300	104	1.58	78	79	60
1961	68	35,565	99	1.46	38,100	106	1.56	88	80	56
1962	71	35,263	98	1.38	39,900	111	1.56	87	81	58
1963	68	35,200	98	1.44	40,600	113	1.66	88	82	59
1964	73	35,200	98	1.34	44,200	123	1.68	89	85	79
1965	69	35,200	98	1.42	47,200	131	1.90	95	86	79
1966	71	34,990	97	1.37	50,400	140	1.97	97	87	78
1967	75	34,710	96	1.28	52,600	146	1.95	94	89	75
1968	71	34,648	96	1.35	55,500	154	2.17	97	91	74
1969	69	34,508	96	1.39	57,300	159	2.30	107	94	74
1970	68	34,460	96	1.41	60,200	167	2.46	116	101	73
1971	70	34,513	98	1.40	64,600	184	2.63	130	112	82
1972	70	33,900	112	1.60	67,400	222	3.17	146	116	83
1973	119	37,707	139	1.17	75,200	277	2.33	164	134	89
1974	224	45,420	156	.70	98,400	337	1.50	233	231	136
1975	197	46,553	157	.80	112,000	377	1.91	238	233	134
1976	181	58,800	198	1.09	121,100	408	2.25	266	238	147
1977	130	60,600	224	1.72	169,833	627	4.82	286	253	158
1978	149	60,600	289	1.94	174,000	829	5.56	289	257	159
1979	187	60,600	277	1.48	178,333	814	4.35	288	258	158
1980 <sup>5</sup>	216	69,145	305	1.41	192,167	847	3.92	316	289	174

<sup>1</sup>Ministry of Finance, *Japan Exports and Imports*, annual issues.

<sup>2</sup>Western White No. 2, Japan fiscal year.

<sup>3</sup>Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.

<sup>4</sup>Office of the Prime Minister, *Monthly Statistics of Japan*, various issues.

<sup>5</sup>Preliminary.

Table 5—Riceland diversion programs<sup>1</sup>

Item	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	<i>1,000 metric tons<sup>2</sup></i>											
Production potential	14,000	14,000	13,950	13,900	13,800	13,500	13,350	13,000	13,000	13,400	13,400	13,600
Production target (PT)	NA	12,500	11,650	11,750	11,750	12,150	12,350	12,100	12,100	11,700	11,700	11,150
Reduction target	NA	1,500	2,300	2,150	2,050	1,350	1,000	900	900	1,700	1,700	2,450
Actual production (AP)	14,003	12,689	10,887	11,889	12,149	12,292	13,165	11,773	13,094	12,589	11,958	9,571
Actual consumption (AC) <sup>3</sup>	11,965	11,948	11,859	11,849	12,077	12,033	11,964	11,819	11,483	11,364	NA	NA
	<i>1,000 hectares</i>											
Actual area planted	3,274	2,923	2,695	2,640	2,622	2,724	2,764	2,779	2,757	2,548	2,497	2,377
Diversion target	NA	NA	580	580	NA	NA	NA	215	215	391	391	535
Actual diverted area	NA	351	541	566	565	286	252	195	214	438	472	585
	<i>Ratio</i>											
Ratio, actual production to production target (AP ÷ PT)	NA	1.02	.93	1.01	1.03	1.01	1.07	.97	1.08	1.08	1.02	.86
Ratio, actual production to production target (AP ÷ AC)	1.17	1.06	.92	1.00	1.01	1.02	1.10	1.00	1.14	1.11	NA	NA

NA = Not available or not applicable.

<sup>1</sup>There were three diversion programs: The Rice Production Control and Diversion Program (1971-75), The Comprehensive Paddy Field Utilization Program (1976-78), and The Paddy Field Utilization Reorientation Program (1978-87).

<sup>2</sup>Brown basis.

<sup>3</sup>Includes rice for direct human consumption, processing, seed, and waste.

Source: Ministry of Agriculture, Forestry, and Fisheries, unpublished data.

yen, reflecting a new set of governmental priorities. In general, the same payments remained in effect for the duration of the 5-year program. A farmer was entitled to receive payment for each year that his land remained out of rice production. The incentive payment for idling land, however, was phased out in 1974, a year early, in light of a worsening world grain situation and the difficulty in justifying the idling of land in a land-poor country such as Japan.

In all but one of the program's 5 years, actual production exceeded the target levels. Only in the first year, 1971, did production fall short of the target (by 760,000 metric tons, 7 percent) due in part to the diversion program, but due chiefly to adverse

weather. Over the 5-year period, rice production exceeded consumption by about 1 percent, thus contributing only small amounts to surplus stocks.

The second program, the Comprehensive Paddy Field Utilization Program, was initiated in 1976 and was scheduled to last for 3 years. Actual production targets were similar to those in the first program. But because the potential for rice production had declined during the previous 5 years with urbanization and the planting of perennials on what was formerly rice area, it was possible to scale down the targeted reduction in rice area. Incentive payments were likewise adjusted as the Government again re-ordered its priorities. Fallowing was not permitted. The largest payment, 400,000 yen per hectare, was

**Table 6—The Japanese Food Agency's involvement in the purchase and sale of rice, milled basis**

Year	(1) Total rice production	(2) Food agency purchases <sup>1</sup>	Purchases (2) compared with total production (1)	(3) Total utilization <sup>2</sup>	(4) Food agency sales	Sales (4) compared with utilization (3)
	-----1,000 metric tons-----		Percent	-----1,000 metric tons----		Percent
1960	11,701	5,740	49.1	10,936	5,249	48.0
1961	11,301	5,505	48.7	11,886	5,715	48.1
1962	11,838	6,628	56.0	12,117	6,480	53.5
1963	11,659	5,652	48.5	12,203	6,507	53.3
1964	11,451	6,351	55.5	12,159	6,725	55.3
1965	11,292	7,538	66.8	11,824	6,956	58.8
1966	11,598	7,285	62.8	11,378	7,032	61.8
1967	13,152	9,727	74.0	11,360	7,255	63.9
1968	13,149	8,203	62.4	11,148	7,026	63.0
1969	12,743	8,437	66.2	10,888	6,962	63.9
1970	11,547	7,558	65.5	11,102	6,543	58.9
1971	9,907	4,894	49.4	12,133	7,386	60.9
1972	10,819	5,070	46.9	11,922	6,898	57.9
1973	11,056	4,858	43.9	11,428	6,379	55.8
1974	11,186	5,049	45.1	10,950	5,674	51.8
1975	11,980	6,378	53.2	10,887	5,015	46.1
1976	10,713	4,772	44.5	10,755	4,459	41.4
1977	11,916	6,428	53.9	10,450	4,668	44.7
1978	11,456	5,551	48.4	10,341	3,792	36.7
1979	10,889	4,563	41.9	NA	4,242	NA

NA = Not available.

<sup>1</sup>Rice marketing year (November through the following October).

<sup>2</sup>Food balance sheets, Japan fiscal year.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.



extended to farmers who planted soybeans, feed crops, and vegetables; 350,000 yen was paid for food grains like barley and wheat, and 300,000 yen for selected nonfood crops. Additional bonus payments were introduced for turning over one's land for group cultivation. Such group-farmed land was consolidated without the transfer of title and was promoted in hopes of improving the general efficiency of Japan's agriculture. These bonuses added 10 to 25 percent to the value of the incentive payments.

In the first year of the second program, actual production was 2.7 percent below target, despite the fact that area diverted fell short of the 215,000-hectare target. The short crop was due to low average yields, the lowest in 5 years. Production in the second year, however, exceeded the target by an unacceptable 8 percent; this led to the Government's decision to abort the program a year early. The nonparticipation of small part-time farmers was identified as a significant problem which had to be rectified to assure the future success of the supply management effort.

The third and current program, the Paddy Field Utilization Reorientation Program, was initiated in 1978. The duration of the program is 10 years (1978-87), the longest to date, conveying a greater public commitment to participants. The program's goal is to reduce rice production by 1.7 million metric tons per year (increased to 2.45 million metric tons in 1980), substantially higher than that in the second program but about the same as in the first program. The eligible uses for diverted paddy area are broadened under the current program but are similar to those under the first. Crops other than those in oversupply may be planted. Other possible uses include afforestation, aquaculture, construction of greenhouses, and improvement of paddy land undertaken during the rice-growing season. Fallowing of riceland, as in the second program, is not permitted.

Finally, several provisions encourage small part-time rice producers to divert their land. One is an incentive to entrust land to a Nōkyō, a local cooperative, to be leased to another farmer under the condition that the land be planted in a nonrice crop. This is designed to stimulate the creation of a market for leased land to help full-time farmers expand

their land base. Bonuses are also paid if a producer participates in a 3-year villagewide program.

The incentive payments for the current program exceed those in the second program in real terms. For the 1978-80 period, payments ranged from 400,000 yen to 550,000 yen per hectare depending on the crop or activity, with bonuses for group diversion ranging from an additional 70,000 yen to 200,000 yen per hectare (table 7).

Such payments were sufficient to make returns to labor and land in nonrice crops substantially greater than in rice production (table 8). As an example, a Japanese farmer who in 1978 planted wheat on what was formerly rice area would have increased net returns per hectare by about 75 percent and returns to management and labor by more than three times (table 9). Without the 550,000-yen per

**Table 7—Incentive payments for growing alternative crops on rice paddy area, 1978-80**

Alternative crop or activity	Basic payment	Bonus for group diversion
	<i>Yen/hectare</i>	
Soybeans, forage crops, wheat, barley, buck- wheat, sugar beets	550,000	100,000-200,000
Perennial crops such as fruits and nuts, mul- berry, asparagus, and hops <sup>1</sup>	550,000	100,000-200,000
Other crops such as vegetables and tobacco <sup>2</sup>	400,000	70,000-130,000
Paddy area entrusted to Nōkyō	400,000	70,000-130,000
Land improvements done during the summer	400,000	0

<sup>1</sup>Excludes satsuma oranges, grapes, cherries, pineapples, and tea.

<sup>2</sup>Excludes sweet and white potatoes for starch or alcohol, konnyaku, and adzuki beans.

Source: Ministry of Agriculture, Forestry, and Fisheries, unpublished data.

hectare incentive payment, net returns per hectare would have been about 40 percent of those for rice, and returns to management and labor would have been slightly greater than for rice.

The large incentive payments are probably justified in the context of Japanese agriculture. There are certain unaccounted costs associated with the farmer's perception of risk in shifting from a familiar crop to an unfamiliar one. Additionally, many rice producers are part-time farmers, who are generally less responsive to price changes than full-time farmers. A relatively larger incentive, therefore, is needed to overcome the inertia of this group.

Japan's performance in reducing rice production during the first 3 years of the current program has been mixed. Production overshot target levels in 1978 and again in 1979 because of record yields in both years. In 1980, the target reduction level and the area target were both increased. The budget for promoting the program was also raised from 228 billion yen to 303 billion yen. Because of an ex-

tremely cool summer and these diversion efforts, 1980 rice production was 1.4 million metric tons below target.

Forage crops, vegetables, soybeans, and grains were planted on about 70 percent of the diverted land area in both 1978 and 1979. In both years an additional 6 to 7 percent was entrusted to a *Nōkyō*, much of which was marginal land that was idled (table 10).

The current diversion program is consistent with three broad Japanese farm policies: to reduce rice production, to increase Japan's agricultural self-sufficiency, and to maintain farm income. The cost to the Government is extremely high and may lead to some adjustment before the end of the 10-year program.

As in previous programs, reduction in rice production is obviously the immediate and most important objective. Rice production and area have declined since the beginning of the program. Rice consumption will continue to decline at least through 1990,

Table 8—Net return to labor with and without incentive payments for selected crops, 1978

Crop	Gross returns	Total primary cost of production <sup>1</sup>	Cost of labor	Incentive payment	Labor	Return to labor	
						Without incentive payment	With incentive payment
----- Yen/hectare -----					Hours/ha	--- Yen/hour ---	
Rice (brown)	<sup>2</sup> 1,570,960	1,089,860	500,020	NA	717	1,368	NA
Wheat	<sup>2</sup> 607,860	403,570	143,886	550,000	203	1,715	4,425
Soybeans	796,720	313,030	133,950	550,000	188	3,285	6,211
Barley (2-row)	590,390	394,340	152,443	550,000	226	1,542	3,976
Sugar beet	895,330	699,520	219,336	550,000	307	1,352	3,144
Cucumber (summer har- vested, open field)	8,299,660	7,288,930	5,436,803	400,000	7,115	906	962

NA = Not applicable.

<sup>1</sup>Primary costs exclude an imputed land rent and interest on capital.

<sup>2</sup>Gross returns for rice and wheat differ from results in table 7 because yields reported in cost of production survey were higher than national averages.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, 1978.



according to MAFF projections necessitating sustained cutbacks in production over the next decade.<sup>7</sup> To bring production and consumption of rice into balance by 1990 will require the diversion of an estimated 760,000 hectares, 175,000 hectares more than were diverted in 1980.

Through large incentive payments, the diversion program has stimulated production of other crops, thus contributing to the goal of increasing self-sufficiency.<sup>8</sup> Area in forage crops, soybeans, and

<sup>7</sup>MAFF makes 10-year projections every 5 years on the supply and demand of major agricultural commodities. These projections serve as guideposts for Japanese agricultural policy.

<sup>8</sup>Defined by MAFF as a ratio of domestic production to total utilization.

grains increased by 22 percent between 1977 and 1979 (table 11). In contrast, the two previous diversion programs had been unable to turn around the declining trend in the area planted in grains, soybeans, and vegetables. The area devoted to feed crops and fruit production had increased but not enough to offset the decline in other important crops. The fallowing of land through 1974 had been partially responsible for this. Land area in priority crops had stabilized between 1973 and 1977, but it was not until 1978, the first year of the current program, that noticeable expansion in non-rice area took place.<sup>9</sup> Official 1990 projections indicate that

<sup>9</sup>Priority crops are selected by the Government and their production is encouraged within the framework of a diversion program.

**Table 9—Net returns per unit of land and labor for rice and wheat under alternative Government programs, 1978**

Item	Unit	Brown rice	Wheat <sup>1</sup>			
			I	II	III	IV
1978 producer price	Yen/metric ton	305,760	174,000	174,000	174,000	NA
Average yield	Metric ton/Ha	4.9	3.3	3.3	3.3	NA
Gross return	Yen/Ha	1,498,224	574,200	574,200	574,200	NA
Diversion payment	Yen/Ha	NA	NA	550,000	—	NA
Winter crop subsidy	Yen/Ha	NA	NA	—	80,000	NA
(A) Total gross return	Yen/Ha	1,498,224	574,200	1,124,200	654,200	2,152,424
(B) 1978 costs of production <sup>2</sup>	Yen/Ha	1,089,860	403,570	403,570	403,570	1,493,430
(C) Cost of labor	Yen/Ha	500,020	143,886	143,886	143,886	643,906
(D) Hours of labor	Hrs/Ha	717	203	203	203	920
A - B (Net return per hectare)	Yen/Hr (Index)	408,364 100	170,630 42	720,630 176	250,630 61	658,994 161
A - B + C (Net return to labor) <sup>3</sup>	Yen/Hr (Index)	1,267 100	1,549 122	4,259 336	1,943 153	1,416 112
$\frac{C}{D}$ (Unit cost of labor)	Yen/Hr	697	709	709	709	700

— = None or negligible.

NA = Not applicable.

<sup>1</sup> I Wheat production on non-diverted land.

II Wheat production on diverted rice area.

III Winter wheat production on rice paddy.

IV Winter wheat and summer rice on same land. Figures represent summation of rice column and Wheat III.

<sup>2</sup>1978 primary production costs excluding land rent and interest on capital, compiled by MAFF.

<sup>3</sup>Includes returns to labor and management.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, 1978.

Table 10—Diverted rice area by alternative crop planted, 1978-79

Riceland diverted to:	1978	Percent of total area diverted	1979	Percent of total area diverted
	<i>Hectare</i>	<i>Percent</i>	<i>Hectare</i>	<i>Percent</i>
Soybeans	69,277	15.8	71,278	15.1
Feed crops	116,823	26.7	123,431	26.1
Wheat	27,746	6.3	40,000	8.5
Barley	11,615	2.7	12,000	2.5
Oats	1,225	.3	1,489	.3
Buckwheat	18,531	4.2	17,178	3.6
Sugar beets	4,363	1.0	4,516	1.0
Fruits and nuts	8,426	1.9	7,743	1.6
Mulberry	622	.1	939	.2
Vegetables	79,931	18.3	86,475	18.3
Pulse crops	12,848	2.9	12,775	2.7
Tobacco	6,322	1.4	6,271	1.3
Other crops	28,505	6.5	32,266	6.8
Paddy field entrusted to Nōkyō	27,475	6.3	33,103	7.0
Land improvements	23,807	5.4	22,575	4.8
Total area diverted	437,516	100.0	472,039	100.0

Source: Ministry of Agriculture, Forestry, and Fisheries, unpublished data.

area in forage production will increase by about 50 percent (from 1 million hectares in 1980 to 1.56 million hectares in 1990), soybean production will more than double, and grain production will nearly double. All of these increases in production will represent increased self-sufficiency by 1990.

As in previous diversion programs, the Government is committed to maintaining farm income by paying rice farmers large incentive payments. If a farmer diverts 1 hectare of rice paddy to wheat production and continues to grow wheat on that land, he will be entitled to a payment of 550,000 yen for each year through 1987. Payments may be reduced in future years, but they will still be substantial. For certain perennial crops, such as mulberry, asparagus, and hops, the payment is discontinued 5 years after planting.

The success of the current program and the country's ability to meet its self-sufficiency targets will depend on the Government's financial support. The program is very expensive, costing 303 billion yen (\$1.4 billion) in 1980 (8 percent of the \$16.7 billion MAFF budget). This amounts to about 530,000 yen for each hectare diverted. The annual cost will continue at the 1980 level (at a minimum) through the life of the program.

Table 11—Cultivated area in selected crops

Crop	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980 <sup>1</sup>
	<i>1,000 hectares</i>											
Soybeans	103	96	101	89	88	93	87	83	79	127	130	142
Feed crops (pasture and other)	682	717	734	757	803	826	840	853	876	948	969	NA
Wheat	287	229	166	114	75	83	90	89	86	112	149	191
Barley	283	225	163	121	80	78	78	80	78	92	116	122
Oats	34	27	30	25	20	17	13	10	8	11	6	6
Sugar beets	59	54	54	58	62	48	48	42	49	58	64	NA
Fruits and nuts	413	416	422	428	431	435	430	423	415	412	NA	NA
Mulberry	163	163	166	164	162	158	151	143	136	130	NA	NA
Vegetables	682	688	689	676	652	642	632	626	630	641	NA	NA
Tobacco	76	71	66	62	59	56	59	63	64	64	63	61
Rapeseed	30	19	14	11	8	5	4	4	3	3	3	2
Total	2,812	2,705	2,605	2,505	2,440	2,441	2,432	2,416	2,424	2,598	NA	NA

NA = Not available.

<sup>1</sup>Preliminary.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.

Whether these costs are excessive depends on the Government's alternatives. For the past 20 years, the Government has purchased 40 to 60 percent of the rice crop at prices three to four times the world level and has resold rice to wholesalers below cost, thus incurring losses on every ton sold. The Government lost at least 375,000 yen per hectare in 1979, about 35 percent of the cost of diverting a hectare to wheat in that year (table 12). So under circumstances when production and consumption of rice are in balance, the budgetary cost of the diversion program would appear excessive.<sup>10</sup> However,

<sup>10</sup>The budgetary cost to the Japanese Government should not be confused with the social cost of the rice policy to the Japanese economy as a whole. The social cost includes: (1) the difference between the cost of inefficiently producing rice in Japan and what it would cost to import rice from more efficient foreign producers; (2) the welfare losses to consumers arising from the reduction in their consumption of rice induced by the higher prices they have to pay compared with those that would prevail in a free trade situation; and (3) the total cost of producing the rice, which is surplus, plus the cost of storing it, minus what is salvaged by exporting it or using it at home for industrial purposes or as feed. See (2).

coinciding with the diversion program is a surplus disposal effort designed to reduce surplus stocks of rice, which amounted to 6.5 million tons in April 1979. Under such circumstances, every hectare of rice in 1979 that added to the surplus would have cost the Government 1.3 million to 1.5 million yen, depending on yield and on whether the surplus rice was subsidized for export or used in livestock feed. In this context, diverting to wheat, expensive as it is, would still save the Government between 250,000 and 400,000 yen per hectare.

Some have argued that the Government would save even more if it paid the farmer what he normally could expect for rice, and then permitted him to plant the land in a crop of his own choosing. This would eliminate the need for large incentive programs. In such a situation, however, the farmer might be inclined to idle his land, which would go against the Government's policy to increase self-sufficiency.

Table 12—Diversión policy alternatives and their budgetary costs per hectare, 1979

Item	Yield	Government expenditure <sup>1</sup>	Government revenues	Program losses	
	<i>Tons/hectare</i>	<i>-----1,000 yen-----</i>		<i>U.S. dollars<sup>2</sup></i>	
Cultivation of rice:					
For human consumption	<sup>3</sup> 4.3	1,589	1,213	376	1,749
For export	4.3	1,589	<sup>4</sup> 261	1,328	6,177
For domestic livestock feeding	4.3	1,589	<sup>5</sup> 123	1,466	6,819
Cultivation of feed-quality rice	8.0	1,589	229	1,360	6,326
Cultivation of wheat on rice paddy	3.0	1,196	<sup>6</sup> 121	1,075	5,000

<sup>1</sup>Includes transportation and handling costs.

<sup>2</sup>Exchange rate: 215 yen per dollar.

<sup>3</sup>Milled basis, average yield for 1975-79.

<sup>4</sup>Assumes an export unit value for rice of 60,663 yen per ton.

<sup>5</sup>Assumes an average import price for corn of \$133 (28,595 yen) per ton.

<sup>6</sup>Assumes an average import price for wheat of \$187 (40,205 yen) per ton.



In summary, the budgetary cost of the current diversion program has been high but substantially cheaper than allowing continued production of rice which would add to surpluses destined for export or livestock feeding. From the farmer's perspective, by planting an alternative crop on land formerly used for rice, returns per hectare and to labor and management would be increased. It might be legitimate for the Government to reduce incentive payments in the future as farmers become more familiar with alternative crops and require less compensation for risk.

### Surplus Disposal Programs

Japan has administered two surplus disposal programs, the first during 1969-74, and the current one initiated in April 1979 and scheduled to last through 1984. Both programs had the express purpose of reducing "burdensome" stocks to more "normal" levels through subsidizing the export and feeding of rice as well as using more rice for various industrial purposes.<sup>11</sup> The 1969-74 program disposed of a total of 7.4 million metric tons at a cost of nearly \$3 billion. This included 3.1 million tons for export, 3.5 million metric tons for feed, and 840,000 metric tons for industrial uses.

The current 5-year program diverted a total of 1.2 million metric tons in the first year (930,000 for export and 270,000 for industrial uses). According to a 1980 revised plan, a total of 6.5 million metric tons will be disposed of by March 1984 at a cost of between \$5 billion and \$10 billion. The April 1980 U.S.-Japan rice agreement limits the amount Japan will export over the next 4 years to 1.6 million metric tons, assuming no unforeseen and unusual circumstances, thus leaving 3.7 million metric tons for feed and industrial uses.<sup>12</sup>

There are three ways in which surplus rice has been and will be utilized: export sales, domestic

livestock feeding, and increased use for industrial purposes. Each of these is discussed below.

### Exports

Japan exported 30,000 metric tons of surplus rice in 1968, the beginning of a major export thrust that would last through 1974 and reduce surplus stocks by about 3.1 million tons. Exporting large quantities of rice was a relatively new experience for Japan which had been a net importer through most of the postwar period until 1968. As production expanded and consumption declined, however, surpluses began to accumulate in the late sixties.

The rationale for exporting surplus rice was simple. It was a relatively easy and quick way to dispose of surplus stocks. By making the terms as favorable as possible, large quantities could be shipped. Certain revisions in existing laws facilitated the export of rice under very favorable terms for the buyer. In 1969, the Food Control Law was revised so that domestic rice could be lent to foreign countries without interest and in the spring of 1970 a food aid bill passed the Diet allowing the Government to step up grants and aid to developing countries.

During the course of the first surplus program, rice was exported as aid under the International Grains Agreement (1967), as a grant through the Japanese Red Cross, or on the basis of long-term low-interest loans. Commercial sales were negligible.

The first major foreign sale took place in 1969 when the Government agreed to lend 330,000 metric tons of rice to South Korea, which had suffered a short crop in 1968. The repayment of the loan was to be in kind over a 20-year period starting in 1980. A similar loan of 300,000 metric tons was also made to South Korea in the following year.

The Government preferred to export rice rather than to use it as a feedstuff, because it was easier politically to justify the use of a surplus food commodity to help people in need. From an administrative standpoint, it was also easier to circumvent the black market problems with exports than with domestic sales for feed.

---

<sup>11</sup>In the first program, 1.4 million metric tons of brown rice was considered a normal stock level, whereas under the current program the target is 2 million metric tons.

<sup>12</sup>The agreement provides that "emergency consultations may be requested by either party where unusual circumstances such as natural disasters, crop failures or other events may increase requirements for food assistance."

The export of rice, however, was probably more expensive to the Government than other possible uses of surplus rice. If rice were sold for cash, a rarity during the first program, the subsidy on rice exports would have been considerably less than that used for feed. Most rice exported over the 6-year period was sold on highly concessional terms, effectively far below the prevailing world rice price.<sup>4</sup> The export price quoted averaged about \$240 per metric ton for the 1969-74 period and substantially undercut world prices toward the end of the program (table 13).

Eighty-eight percent of Japanese rice exports between 1969-74 were destined for three markets: South Korea (45 percent), Indonesia (27 percent), and Pakistan and Bangladesh (16 percent). Total exports averaged almost 520,000 metric tons per year and represented about 6 percent of world rice trade (table 14).

Any trader that enters a market as abruptly as Japan did in 1969 is bound to have an impact on

traditional trade relationships. In the case of both the Indonesian and South Korean rice markets, the Japanese share of rice imports increased from nothing to an average of 15 and 33 percent per year for the duration of the export program. In the Korean market, historically dominated by the United States, the U.S. share dropped from 72 percent in 1967-68 to 65 percent during 1969-74. In the case of Indonesia, a market with more diversified sources of supply, the United States actually improved its share despite Japanese competition. Thailand's share in this market, however, fell.

### Feeding Rice

Under the first surplus program, rice was used in formula feed for the first time, as another, albeit costly, way of using large quantities of surplus rice. (Various byproducts of rice, such as rice straw, rice bran, and rice bran oilmeal have been used extensively for livestock feeding.) Since Japan had no prior experience in using rice in formula feed, it felt compelled to test its technical feasibility and to consider carefully possible administrative problems.

**Table 13—Japanese export unit values for rice and comparisons with other rice prices, milled basis**

Year	Japanese rice, export unit value <sup>1</sup>	Yen/dollar exchange rate <sup>2</sup>	(1) Japanese rice, export unit value	(2) Thai long grain 5-7% broken, f.o.b. Bangkok <sup>3</sup>	(3) U.S. milled No. 2, long, 4% broken, f.o.b. Houston <sup>4</sup>	(1)/(2)	(1)/(3)
	<i>Yen per metric ton</i>	<i>Yen per dollar</i>	<i>-----Dollars/metric ton-----</i>			<i>-- Ratio --</i>	
1969	152,280	360	423	186	217	2.27	1.95
1970	98,640	360	274	143	220	1.92	1.25
1971	51,597	351	147	129	223	1.14	.66
1972	48,783	303	161	148	245	1.09	.66
1973	53,387	271	197	276	481	.71	.41
1974	63,364	292	217	542	624	.40	.35
1975	67,716	297	228	363	469	.63	.49
1976	396,495	297	1,335	254	357	.5	.5
1977	91,327	271	337	272	374	1.24	.90
1978	78,120	210	372	369	380	1.01	.98
1979	60,663	219	277	334	446	.83	.62
1980	82,930	227	365	432	503	.84	.73

<sup>1</sup>Ministry of Finance, *Japan Exports and Imports*, annual issues.

<sup>2</sup>International Monetary Fund, *International Financial Statistics*, various issues.

<sup>3</sup>Bank of Thailand, *Monthly Bulletin*, various issues.

<sup>4</sup>U.S. Dept. of Agriculture, Agricultural Marketing Service, *Rice Market News*.

<sup>5</sup>Not a meaningful comparison. Japan exported less than 500 tons of rice in 1976.

Feeding experiments were carried out under the auspices of the National Institute of Animal Industry (MAFF) in June 1969 and by the Japan Scientific Feeds Association in August 1969. The National Institute found that the duration of storage could affect the nutrient value of rice and increase the presence of free fatty acids. Tests with layers, swine, and goats found no significant differences between corn and rice in feed value, implying a near one-to-one substitutability of rice for corn. The Japan Feed Science Laboratory found that rice could be used at a rate of 10 to 20 percent in compound feeds for broilers, layers, and hogs without affecting weight gains, production of eggs, or the animals' appetite. Large proportions of rice in layer rations, however, did tend to make the egg yolk a paler yellow.

To anticipate any administrative problems, 30 experts were invited by the Government over a 4-month period to develop an efficient and practical plan for the disposal of rice. Their report, submitted in October 1970, indicated that it would be feasible to incorporate as much as 1.4 million metric tons of

rice annually in formula feed. The emergence of a health problem in March 1970 jeopardized the start of the feeding program. Culture tests showed that some 1967 rice destined for feed use was contaminated with a toxic mold. The contaminated rice was not sold as food or feed but rather for industrial alcohol and dyeing starch. Subsequent tests ascertained that rice with less than 15-percent moisture content was safe. Three months after the outbreak, the prohibition on the sale of 1967 rice was lifted.

The first actual transfer of rice from Government stockpiles to feed manufacturers was set for August 1970. The 35-month feeding program met with some administrative and political problems. It was feared that the great difference between the food and feed prices of rice would encourage the black marketing of feed rice. In order to assure its use as feed, the rice was crushed, denatured, or otherwise rendered unfit for human consumption.

The pricing of feed rice also posed considerable problems. Since rice was nutritionally similar to corn, its price had to be closely linked to that of

**Table 14—Japan's rice exports and its share of rice imports by Indonesia, Bangladesh, and Korea, milled basis**

Year	Total Japanese rice exports <sup>1</sup>	Total world rice trade <sup>2</sup>	Japan's share of total	Combined rice imports of Indonesia, Bangladesh, and Korea			
				Total	Market shares		
					Japan	United States	Thailand
	--1,000 metric tons--		Percent	1,000 metric tons	-----Percent-----		
1969	330	7,140	4.6	1,475	23.4	46.4	5.7
1970	597	7,852	7.6	2,236	21.6	37.7	6.4
1971	909	8,666	10.5	1,858	37.9	36.9	6.0
1972	200	8,749	2.3	2,030	7.8	43.0	13.7
1973	517	8,322	6.2	2,168	20.1	19.9	14.0
1974	284	8,355	3.4	1,493	15.5	22.8	8.8
1975	10	7,842	—	1,596	0.7	49.4	2.3
1976	—	8,955	—	1,753	—	37.2	31.3
1977	17	10,551	—	2,458	—	20.9	39.5
1978	75	9,632	0.8	1,863	4.0	21.0	10.0
1979	564	11,841	4.8	2,976	16.1	15.2	25.5
1980	653	12,733	5.1	3,100	NA	NA	NA

— = None or negligible.

NA = Not available.

<sup>1</sup>Ministry of Finance, *Japan Exports and Imports*, annual issues.

<sup>2</sup>U.S. Dept. of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, various issues.



corn so as not to give undue advantage or disadvantage to feed manufacturers who used rice. The price was weighted by the price of corn and soybean meal according to the total digestible nutrient and digestible crude protein content of rice. It was difficult to administer such a price over the 35-month period because of fluctuations in world commodity and transportation prices, particularly in 1973.

The political problems were twofold. First, the overall cost of feeding rice was at least as expensive as that of exporting rice. To make rice competitive with comparable feedstuffs, the Government had to absorb tremendous losses. In 1971, the first full year of the feeding program, the Government lost \$315 per ton sold for livestock feeding. With 1.3 million tons sold for feed that year, the Food Agency incurred losses of almost \$400 million.

Second, rice is a traditional food staple and, except in very small amounts, had never been fed to livestock prior to September 1970. With the food shortages of World War II still fresh in the minds of many Japanese, it was difficult to convince the public that a food grain should be fed to livestock at about one-fifth the price that consumers were paying.

Once the feeding program was underway, Food Agency sales of feed rice averaged about 100,000 tons per month. As a proportion of total formula feed, rice accounted for 8.9 percent in 1971, 7 percent in 1972, and 2.7 percent in 1973. These proportions were well under the technical limits of 10 to 20 percent (table 15). Almost 60 percent of the rice used ended up in broiler and layer rations, 30 percent in swine rations, and most of the remainder in beef and dairy rations.

The impact of rice feeding on imports of feed grains was clear. Imports of feed corn and sorghum virtually stagnated during 1970-72, despite growth in formula feed production of about 9 percent per year (table 16).

In the early sixties, corn use in formula feed accounted for about 44 percent of the weight of all ingredients (table 17). As a greater variety of ingredients was used thereafter, corn's importance diminished while sorghum's increased. Corn utilization was the most severely affected by the rice-feeding

program, falling to 30 percent in 1970-73, then returning to 37 percent after termination of the program.

Growth in formula feed production and increased utilization of grains were not enough to offset the impact of feeding 3.45 million metric tons of rice. Although rice displaced corn and sorghum, it did stimulate protein meal utilization since the protein content of brown rice is slightly less than that of corn and sorghum.

### Industrial Use

The use of surplus rice for industrial purposes is the least understood of the three. Since 1965, an average of 705,000 metric tons of rice per year have been absorbed by so-called industrial uses, which include such processed food items as sake, soybean paste, soy sauce, rice cakes, and rice flour (table 18). Rice cakes and rice flour are classified as an industrial use by the Food Agency, whereas in MAFF food balance sheets, they are considered part of direct food consumption.

The Food Agency accounts show that sales of rice for industrial purposes averaged about 725,000 metric tons per year from 1965-69 (table 19). During 1969-74, sales dropped to about 300,000 metric tons per year and remained at that level after the end of the surplus disposal program. The precipitous decline resulted from the waiving of the rice allocation system for industrial uses in August 1969. As a result, sake manufacturers and other processors of rice products were able to purchase rice outside of Government channels.

Both disposal programs earmarked surplus rice for industrial purposes. The amounts have been relatively large compared with the total industrial use of rice. During the first program, 200,000 metric tons of surplus rice per year were supposedly diverted to industrial uses compared with total industrial use of about 730,000 metric tons per year. Did the Food Agency sale of 200,000 metric tons imply a net increase by that amount in utilization of rice for industrial purposes? If it did, it would have meant a 27-percent increase in consumption, a large increase for a category that includes sake and traditional foods. Such an increase, however, was never observed. According to the MAFF food balance sheets,

Table 15—Japanese formula feed production, grain and protein meal utilization

Japan fiscal year	Corn	Sorghum	Other grain <sup>1</sup>	Total grain	Rice	Soybean meal	Other oilseed meal	Fish- meal	Animal byproduct meals	Nonfat dry milk	Soybean meal equiv. <sup>2</sup>	Total
						1,000 tons <sup>3</sup>						
1969	4,765	2,939	321	8,025 (59.7)	0	1,239	608	502	96	45	2,540 (18.9)	13,443
1970	4,417	3,972	736	9,125 (60.4)	0	1,469	684	474	82	45	2,767 (18.3)	15,097
1971	3,949	3,615	621	8,185 (52.0)	1,405 (8.9)	1,596	665	511	76	41	2,924 (18.6)	15,749
1972	5,232	3,603	681	9,516 (54.6)	1,227 (7.0)	1,778	661	559	97	41	3,197 (18.3)	17,425
1973	6,332	3,895	672	10,899 (60.1)	493 (2.7)	1,776	635	587	116	43	3,241 (17.9)	18,140
1974	6,093	4,197	494	10,784 (63.2)	0	1,709	522	552	113	31	3,032 (17.8)	17,074
1975	6,263	3,815	571	10,649 (63.0)	0	1,787	434	588	160	34	3,158 (18.7)	16,897
1976	6,787	4,613	509	11,909 (63.8)	0	1,942	480	615	194	57	3,441 (18.4)	18,671
1977	7,351	5,031	560	12,942 (64.9)	0	2,205	393	565	288	98	3,712 (18.6)	19,948
1978	8,164	5,105	619	13,888 (65.5)	0	2,363	361	619	327	101	3,974 (18.7)	21,210
1979	8,934	5,481	702	15,117 (66.3)	0	2,474	403	645	331	104	4,159 (18.2)	22,796

<sup>1</sup>Wheat, barley, rye, and other grains.<sup>2</sup>Soybean meal equivalent calculated using 0.71 for other oilseeds, 1.44 for fishmeal, 1.2 for animal byproduct meals, and 0.7 for nonfat dry milk.<sup>3</sup>Numbers in parentheses equal percentage of total production.Source: Ministry of Agriculture, Forestry, and Fisheries, *Feed Monthly*, various issues.

**Table 16—Japanese imports of selected coarse grains and the U.S. share**

Year	Corn			Sorghum			Barley		
	Total	From United States	U.S. share	Total	From United States	U.S. share	Total	From United States	U.S. share
	1,000 metric tons		Percent	1,000 metric tons		Percent	1,000 metric tons		Percent
1969	5,489	3,439	62.7	2,859	1,934	67.6	677	6	1.0
1970	6,018	4,394	73.0	3,789	2,188	57.7	768	—	—
1971	5,007	2,682	53.6	3,811	1,578	41.4	865	—	—
1972	6,052	3,398	56.1	3,505	2,049	58.5	1,004	4	—
1973	7,771	6,539	84.1	3,742	2,733	73.0	1,322	123	9.3
1974	7,940	6,169	77.7	4,474	2,831	63.3	1,418	83	5.9
1975	7,470	5,354	71.7	3,794	2,012	53.0	1,598	—	—
1976	8,383	6,237	74.4	4,227	2,234	52.9	1,762	110	6.2
1977	9,068	7,470	82.4	5,181	2,443	47.2	1,735	69	4.0
1978	10,534	8,563	81.3	5,112	2,347	45.9	1,490	75	5.0
1979	11,407	9,829	86.2	5,355	2,299	42.9	1,519	14	1.0

— = Negligible or zero.

Source: Ministry of Finance, *Japan Exports and Imports*, annual issues.

**Table 17—Proportion of selected ingredients in total formula feed output**

Period	Corn	Sorghum	Rice	Other grains	Total grain
	Percent				
1960-64	44	8	0	2	54
1965-69	35	22	0	2	59
1970-73	30	23	5	4	62
1974-78	37	24	0	3	64

Source: Ministry of Agriculture, Forestry, and Fisheries, *Feed Monthly*, various issues.

industrial use during the disposal program increased by only 9 percent compared with the 1965-68 period (table 18). Apparently some of the 200,000 metric tons of surplus rice sold for industrial purposes replaced new crop rice that would have been used under more normal circumstances. The net increase in consumption was, therefore, something less than 200,000 metric tons.

Under the current program, 300,000 metric tons of surplus rice per year are earmarked for industrial

use. Although Food Agency accounts will show disposal of approximately that amount, the net increase in total utilization will be much less.

### The Impact of Japan's Rice Policy on U.S. Agricultural Trade

Japan's rice policy in its current form will continue to incur large budgetary costs on the Japanese taxpayer and have varying effects on U.S.-Japanese agricultural trade. Japan spent about \$5.2 billion in JFY 1980 on its rice program. Policy changes, which manifested themselves in late 1979 and through 1980, reduced world commodity prices both through reduced import demand (self-sufficiency oriented programs) and increased export supply (the surplus disposal program). The most affected commodities in 1980 from the U.S. view were wheat and rice.

Japan's pricing policy and diversion programs, which are designed to increase the self-sufficiency of Japanese agriculture, reduced import demand for U.S. wheat by about \$30 million in 1980. Japan's exports of surplus rice in 1980 reduced world prices below what they would have been and reduced U.S. export revenues by an estimated \$20 million. Dis-

Table 18—Rice balance sheet

Japan fiscal year	Produc- tion	Imports	Exports	Stock change	Total utiliza- tion	Food	Feed	Indus- trial uses	Seed and waste
<i>1,000 metric tons</i>									
1965	12,409	1,052	0	468	12,993	12,037	20	606	330
1966	12,745	679	0	921	12,503	11,512	28	636	327
1967	14,453	364	0	2,334	12,483	11,412	26	714	331
1968	14,449	265	35	2,428	12,251	11,188	26	707	330
1969	14,003	48	440	1,646	11,965	10,972	26	640	327
1970	12,689	15	785	- 281	12,200	10,894	274	712	320
1971	10,887	10	859	- 3,295	13,333	10,812	1,490	718	313
1972	11,889	1	459	- 1,672	13,103	10,788	1,265	734	316
1973	12,149	38	430	- 800	12,557	10,941	496	807	313
1974	12,292	63	271	51	12,033	10,950	13	754	316
1975	13,165	29	2	1,228	11,964	10,878	10	758	318
1976	11,772	18	3	- 32	11,819	10,761	12	729	317
1977	13,095	71	100	1,583	11,483	10,487	9	676	311
1978	12,589	45	1	1,269	11,364	10,367	8	685	304
1979	11,958	20	868	- 108	11,218	10,227	7	685	299

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.

Table 19—Food Agency procurement and distribution of rice

Rice year <sup>1</sup>	Beginning stocks	Procure- ment	Total supply	Food	Industry	Export	Feed	Total sales	Ending stocks
<i>1,000 tons</i>									
1964	2,790	8,238	11,028	6,869	727	—	—	7,596	3,432
1965	3,432	7,974	11,406	6,897	792	—	—	7,689	3,717
1966	3,717	10,655	14,372	7,130	818	—	—	7,948	6,424
1967	6,424	8,986	15,410	6,843	846	—	—	7,689	7,721
1968	7,721	9,251	16,972	6,525	776	332	—	7,633	9,339
1969	9,339	8,285	17,624	6,297	251	588	38	7,174	10,450
1970	10,450	5,378	15,828	5,843	240	1,026	1,007	8,116	7,747
1971	7,747	5,571	13,318	5,580	284	256	1,460	7,580	5,750
1972	5,750	5,338	11,088	5,142	310	604	954	7,010	4,088
1973	4,088	5,548	9,636	5,580	323	332	—	6,235	3,404
1974	3,404	7,009	10,413	5,180	274	57	—	5,511	4,909
1975	4,909	5,244	10,153	4,599	301	—	—	4,900	5,262
1976	5,262	7,064	12,326	4,860	270	—	—	5,130	7,203
1977	7,203	6,100	13,303	3,723	344	100	—	4,167	9,145
1978	9,145	5,014	14,159	3,841	320	500	—	4,661	9,498
1979	9,507	4,606	14,113	4,320	376	709	—	5,405	8,708

— = None or negligible.

<sup>1</sup>Rice year extends from November through the following October.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.



posal of rice as a feedstuff was not carried out in 1980 but has the potential of displacing coarse grain trade from the Japanese market and dampening world coarse grain prices.

In the following section, the more direct trade effects of Japan's rice policy are examined, particularly those affecting U.S.-Japanese agricultural trade, focusing especially on 1980.

### Pricing Policy

The Food Agency raised the resale price of wheat by 14.1 percent and the resale price of rice by 3.2 percent, effective February 1980. Since wheat and rice are substitutes, this change in their relative resale prices reduced wheat consumption and imports to the extent that the United States lost about \$7 million in wheat trade with Japan in 1980 (see appendix for calculation).

The standard producer price of rice remained unchanged in 1980 but a differential pricing scheme was introduced to encourage production of preferred types of rice. Producer wheat prices were raised by 2.5 percent in February 1980, a small increase that did not make much difference. But large diversion payments and subsidies for double-cropping did encourage increased wheat production in 1980.

### Diversion Programs

Of particular interest to the United States are increases in Japan's wheat production, which would tend to reduce the volume of U.S. wheat exports to Japan. Between 1977 and 1980, wheat area expanded by 144 percent due in large part to the Government's effort to divert rice area to wheat and to increase the double-cropping of rice and wheat. The increased wheat production attributable to these programs is that amount produced on lands in excess of the 1977 base area of 86,000 hectares.<sup>13</sup> By

<sup>13</sup>The base year was chosen as 1977 because it coincides fairly well with the beginning of the double-cropping program (1976) and the current diversion program (1978). It is assumed that, without these programs, wheat production would have remained constant. In addition, yields are assumed to be the same on diverted and double-cropped lands as on the base area.

1979, wheat area had expanded to 149,000 hectares, or 63,000 hectares more than the 1977 base area (table 20). With yields at 3.6 metric tons per hectare, total production on "diverted" and double-cropped area amounted to 227,000 metric tons. Assuming that import demand was reduced by the same amount during the year following the harvest, and assuming that the U.S. share of the reduced amount was its historical 57 percent, and assuming that the f.o.b. (free on board) wheat price was \$175 per ton, then the United States lost about \$23 million in wheat trade with Japan in 1980 due to Japan's diversion and double-cropping programs in 1979.

In 1980, Japan's wheat area expanded to 191,000 hectares, 105,000 hectares more than the base area. With yields averaging about 3.1 metric tons per hectare, total production on lands above the 1977 base area was about 326,000 metric tons. If the United States loses 57 percent of this amount and the f.o.b. wheat price in 1981 is \$190 per ton, then the United States will stand to lose \$35 million worth of wheat trade with Japan in 1981.

Production of other crops stimulated by the diversion program also affects other U.S. agricultural exports as well, but to a lesser extent. Soybeans and forage products are probably the leading examples.

### Surplus Disposal Programs

**Rice exports.** Japanese rice exports have constituted unexpected and sometimes large additions to the world's export supply, amounting to as much as 10.5 percent of the total in 1971. More recently, Japan's rice exports in 1980 were 720,000 tons, or 5.1 percent of total trade. Such amounts, which could not have been exported without heavy subsidies, helped to reduce world prices and thus drew criticism from other rice-exporting countries.

The impact of increases in rice exports on world prices has been difficult to quantify. Grant and Leath estimated the elasticity of demand for world rice exports with respect to the U.S. export price at -3.05 in 1975 (7).<sup>14</sup> The authors warn that the coeffi-

<sup>14</sup>That is to say, a 1-percent increase in the total quantity exported would reduce the U.S. export price by 0.3 percent.

cient must be viewed with caution since the t-statistic for the accuracy of the estimate is relatively low. If it is assumed that the above elasticity reflects the responsiveness of importers to price changes in 1980, and that the shortrun supply curve is perfectly inelastic, then Japan's subsidized rice exports in 1980 reduced U.S. export prices by 1.7

percent, or \$7 per ton.<sup>15</sup> Since U.S. rice exports were 2.9 million metric tons out of a total harvest of 4.3 million metric tons in 1980, the total loss of export revenues from the price reduction was \$20 million. If the shortrun export supply curve were upward sloping, however, the price reduction and export revenue loss would have been less with some trade displacement.

**Table 20—Japanese wheat production and increases due to diversion and subsidy programs**

Year	Wheat area	Wheat production	Yield	Increase in production due to programs
	Hectares	Metric tons	Tons per hectare	Metric tons
1977	86,000	236,000	2.7	NA
1978	112,000	366,000	3.3	86,000
1979	149,000	541,000	3.6	227,000
1980	191,000	583,000	3.1	326,000

NA = Not applicable.

Source: Ministry of Agriculture, Forestry, and Fisheries, *Monthly Statistics*, various issues.

In bilateral discussions with the United States in April 1980, Japan agreed to limit its exports of rice during the remaining 4 years of the disposal program to 1.6 million tons. Exports of 420,000 tons were specified for the period April 1980 through March 1981, but that amount was exceeded because of large emergency shipments to South Korea.

**Feeding Rice.** No surplus rice was diverted to feed use in 1980. As shown in table 21, the current surplus program, however, targeted 2.3 million metric tons for use as feed by the end of the program (March 1984). The amount that is finally used will depend on political factors and unexpected contingencies. The most important political consideration is the April 1980 U.S.-Japan bilateral agreement.

<sup>15</sup>Assuming an f.o.b. export price of \$400 per ton.

**Table 21—Planned versus actual and likely allocations of surplus rice, 1979-83**

Item	1979 <sup>1</sup>	1980	1981	1982	1983	Total
<i>1,000 metric tons<sup>2</sup></i>						
Beginning surplus stocks	6,500	5,300	2,910	1,560	780	
Industrial use	270	280	150	150	150	1,000
	(300)	(300)	(300)	(300)	(300)	(1,500)
Export	930	710	700	390	390	3,120
	(200)	(200)	(200)	(200)	(200)	(1,000)
Feed	0	0	500	240	240	980
	(100)	(500)	(500)	(600)	(600)	(2,300)
Rice stocks drawn down for current human consumption <sup>3</sup>	0	1,400	NA	NA	NA	NA
Ending surplus stocks	5,300	2,910	1,560	780	0	NA

<sup>1</sup>Japan fiscal year, April through March.

<sup>2</sup>Numbers in parentheses represent surplus disposal amounts as originally planned by the Food Agency in 1979.

<sup>3</sup>With a poor rice crop in 1980, stocks of old rice were used for human consumption.



Adverse weather in Japan during 1980 also changed allocation plans by reducing surplus stocks below their anticipated levels by 1.4 million metric tons. The amount used for feed in the remaining years of the program will be much less than originally planned.

The impact of this aspect of the program on U.S.-Japanese agricultural trade will depend on how much rice is finally used as a feedstuff. If rice displaces corn and sorghum in formula feed rations on a near one-to-one basis, one would expect that for every ton of rice diverted to feed, one less ton of either corn or sorghum will be imported. The United States, which maintained an 80-percent share of Japanese corn and sorghum imports in 1980, would have lost \$104 for every ton of rice fed in 1980 assuming a price of \$130 per ton.<sup>16</sup> The relative prices of corn, sorghum, and rice faced by

<sup>16</sup>The average share for 1975-79 was 65 percent. The U.S. grain embargo of the Soviet Union increased the U.S. share to more than 80 percent in 1980.

Japanese feed mills would affect the relative quantities of each used. If prices favor greater displacement of sorghum, then the cost to the United States will be less since the United States has held a relatively smaller share of sorghum imports over the years.

Another impact of the Japanese rice feeding program will be a slight decline in world coarse grain prices. Again, the extent of the impact depends on how much rice is finally used.

**Use Of Rice for Industrial Purposes.** When the current program's original plan was announced, 300,000 metric tons of surplus rice per year were earmarked for industrial use over the 5-year life of the program. This rice, however, will not reduce surplus stocks by the same amount, since part of the subsidized old rice from stocks will merely substitute for purchases of new rice by industrial processors. The older rice is less preferred by commercial buyers and, therefore, more difficult to dispose of. The impact of this part of the disposal program on U.S. trade will probably be negligible.

## Bibliography

- (1) Amatatsu, Katsumi. *Growing Rice in Japan*, Agriculture, Forestry, and Fisheries Productivity Conference, Tokyo, Dec. 1959.
- (2) Bale, Malcolm, and Bruce Greenshields. *Japan: Production and Imports of Food—An Analysis of the Welfare Cost of Protection*, FAER-141. U.S. Dept. Agr., Econ. Res. Serv., Nov. 1977.
- (3) Bishop, Robert V. "Documentation of the Elasticities Underlying Current Grains, Oilseeds, and Livestock (GOL) Model." Unpublished manuscript, U.S. Dept. Agr., Econ. Stat. Coop. Serv., Jan. 1980.
- (4) Chinn, Dennis L. "Staple Food Control and Industrial Development in Postwar Japan. 1950-57: The Role of the Black Market." *Journal of Development Economics*, North-Holland Pub. Co., June 1977.
- (5) Coyle, William T. "U.S. Farm Trade Vital to Growth of Japanese Livestock Industry During the 1980's." *Foreign Agriculture*, Vol. XVIII, No. 4, Apr. 1980.
- (6) Donnelly, Michael W. "Setting the Price of Rice—A Study in Political Decisionmaking." *Policymaking in Contemporary Japan*, ed. T. J. Pempel, Cornell Univ. Press, Ithaca, N.Y., 1977.
- (7) Grant, W. R., and M. N. Leath. *Factors Affecting Supply, Demand and Prices of U.S. Rice*, ESCS-47. U.S. Dept. Agr., Econ. Stat. Coop. Serv., Mar. 1979.
- (8) Greenshields, Bruce L. *Impact of a Resale Price Increase on Japan's Wheat Imports*, FAER-128. U.S. Dept. Agr., Econ. Res. Serv., Feb. 1977.

- (9) Hayami, Yujiro. "Rice Policy in Japan's Economic Development." *American Journal of Agricultural Economics*, Feb. 1972.
- (10) Hemmi, Kenzo. "Agriculture and Politics in Japan." Unpublished paper, Univ. of Tokyo, 1979.
- (11) Government of Japan, Ministry of Agriculture, Forestry, and Fisheries. *Statistical Yearbook of Ministry of Agriculture, Forestry, and Fisheries*, various issues.
- (12) ———, Ministry of Finance. *Japan Exports and Imports Commodity by Country*, various issues.
- (13) ———, Office of the Prime Minister. *Japan Statistical Yearbook*, various issues.
- (14) Kimura, Kiichi. "The Role of Rice for Feed." *Food Control Monthly Report*, published by the Food Agency, Ministry of Agriculture and Forestry, 1971.
- (15) Matsumoto, Takeo. *Staple Food Control in Japan*. Agriculture, Forestry, and Fisheries Productivity Conference, Tokyo, Japan, Aug. 1959.
- (16) Ogura, Takekazu. *Can Japanese Agriculture Survive?* Agricultural Policy Research Center, Tokyo, Japan, 1980.
- (17) Seko, Hideo. *Lowland Rice and Upland Farming in Japan: Tables and Figures*, Fuji Pub. Co. Ltd., Tokyo, Japan, 1968.
- (18) Roberts, Ivan, Robert Bain, and Eric Saxon. *Japanese Agricultural Policies: The Origin, Nature and Effects on Production and Trade*. Bureau of Agricultural Economics, Canberra, Australia, Feb. 1981.
- (19) Tetro, Robert, and William Coyle. "Surplus Rice Situation in Japan: Impact on U.S. Agricultural Trade." Staff Report. U.S. Dept. Agr., Econ. Stat. Coop. Serv., June 12, 1980.
- (20) Yuize, Yasuhiko, "Agonies of Agricultural Administration," *Japan Quarterly*, published by Asahi Shimbun, Tokyo, Vol. 25, July-Sept. 1978.

## APPENDIX: Results of Statistical Analysis

Japanese wheat consumption is assumed to be a linear function of rice and wheat prices and per capita income. The coefficients are estimated by ordinary least squares regression analysis. The sample period is the JFY 1960-79. Data used are given in appendix table 1. The equation and its estimated coefficients are as follows:

$$\begin{aligned} \text{PERCAPW} = & .049942 - .000130 \text{ DEFLW} \\ & (7.5478) \quad (3.1717) \\ & + .000036 \text{ DEFLR} \\ & (2.92462) \\ & + .320576 \text{ PERY} \\ & (.136080) \end{aligned}$$

Where:

- PERCAPW = Wheat consumption per capita, kilograms per person,
- DEFLW = Wheat price (resale price of U.S. Western white No. 2), yen per metric ton deflated by the CPI,
- DEFLR = Rice price (resale price of domestic rice), yen per metric ton, deflated by the CPI, brown basis,
- PERY = GNP per capita deflated by the CPI, million yen per person.

The t-statistics are in parentheses under the coefficients.

Other statistics of the equation are:

$$\text{Coefficient of determination (R}^2\text{)} = 0.91,$$

$$\text{Mean of the dependent variable} = 0.0496,$$

$$\text{Durbin-Watson (d)} = 1.77.$$

The derived demand elasticities, measured at the means of the variables, are:

$$\text{Price (DEFLW)} = -0.18$$

$$\text{Cross price (DEFLR)} = +0.16$$

In February 1980, the nominal resale prices of wheat and rice were increased by 14.1 and 3.2 percent, respectively. Using the above equation, the impact of these price changes on wheat consumption is estimated assuming a 1980 population growth of 0.9 percent and an increase in the CPI of 8 percent. The income variable was not significant. According to the model, the combined price changes in 1980 reduced per capita wheat consumption by 1.2 percent or 0.6 kg/per capita that year after controlling for the impact of changes in income and population. Total wheat consumption was reduced by about 70,000 metric tons. Assuming that Japanese imports were reduced by a like amount, that the United States maintained a historical share of 57 percent, and that wheat prices averaged \$175 f.a.s. (free alongside ship) per metric ton, then the United States lost about \$7 million in wheat trade with Japan in 1980.

Appendix table 1—Data used for Japanese wheat consumption analysis

Year	Wheat consumption <sup>1</sup>	Resale price of rice <sup>2</sup>	Resale price of wheat <sup>2</sup>	Japanese population <sup>3</sup>	Gross national product <sup>3</sup>	Consumer Price Index <sup>3</sup>
	1,000 metric tons	----Yen/metric ton----		Thousands	Million yen	1,000 = 1975
1960	4,187	79,687	35,910	93,419	16,207	332
1961	4,165	79,231	35,565	94,287	19,853	347
1962	4,390	82,601	35,263	95,181	21,660	371
1963	4,455	88,260	35,200	96,156	25,592	402
1964	4,710	91,484	35,200	97,182	29,662	417
1965	4,704	104,963	35,200	98,274	32,814	445
1966	4,967	111,850	34,990	99,036	38,419	468
1967	5,070	119,945	34,710	100,196	45,297	486
1968	5,169	133,168	34,648	101,331	53,288	512
1969	5,265	137,308	34,508	102,536	62,260	539
1970	5,183	136,300	34,460	104,665	73,046	580
1971	5,311	135,110	34,513	106,093	81,577	615
1972	5,558	138,864	33,900	107,589	94,729	643
1973	5,585	142,967	37,707	109,102	115,605	719
1974	5,567	165,073	45,420	110,573	136,339	894
1975	5,778	208,663	46,553	111,934	153,278	1,000
1976	5,737	236,850	58,800	113,089	171,876	1,093
1977	5,815	260,458	60,600	114,154	190,713	1,181
1978	6,066	270,531	60,600	115,174	209,248	1,226
1979	6,170	272,418	62,248	116,200	224,777	1,270

<sup>1</sup>U.S. Dept. of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, various issues.<sup>2</sup>Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook*, annual issues.<sup>3</sup>Office of The Prime Minister, *Japan Statistical Yearbook*.





UNITED STATES DEPARTMENT OF AGRICULTURE  
WASHINGTON, D.C. 20250

---

POSTAGE AND F  
U.S. DEPARTM  
AGRICULT  
AGR 101

NATIONAL AGRICULTURAL LIBRARY



1022987345

THIRD CLASS

